

**WHAT IS CLAIMED IS:**

1. An information processing method of receiving encoded image data compression-coded for each tile and encrypting the encoded image data, characterized by comprising:
  - repeatedly forming one tile group from a plurality of adjacent tiles and another tile group from a plurality of adjacent tile groups so as to define a hierarchical structure of the tiles and tile groups,
  - and for a plurality of partial encoded data that constitute encoded data of a tile located at a terminal of the hierarchical structure, arranging the partial encoded data toward the terminal in ascending order of priority in decryption so as to define a tree structure that nodes the respective tile groups, the respective tiles, and the respective partial encoded data;
  - generating encryption key information for a node located at an uppermost layer of the tree structure for an entire image expressed by the encoded image data;
  - executing, up to a node located at the terminal, processing for generating encryption key information for a node of interest on the basis of encryption key information generated for a node located at an upper layer;
  - when a designation input is given to define, as an object to be encrypted, a desired node position in nodes of the partial encoded data in the tree

structure, setting, as an object to be encrypted,  
partial encoded data which is located at a higher layer  
and contains partial encoded data at the node position  
that is defined by the designation input; and

5           executing encryption processing for each partial  
encoded data, which is set as an object to be  
encrypted, by using an encryption key generated for the  
partial encoded data and outputting the encrypted  
partial encoded data and unencrypted partial encoded  
10 data.

2.       The method according to claim 1, characterized in  
that the encryption key information is generated using  
a function which has a one-way direction from the upper  
layer to a lower layer.

15 3.       The method according to claim 2, characterized in  
that the function generates the key information by  
using coordinate position information of a tile group,  
a tile, or partial encoded data located at the lower  
layer.

20 4.       The method according to claim 1, characterized in  
that the encryption key information of the uppermost  
layer is output to a predetermined authentication  
server on the Internet.

5.       The method according to claim 1, characterized in  
25 that

the method further comprises a step of displaying  
the received encoded data as a hierarchical structure

of tiles, tile groups, and partial encoded data, and  
the desired partial encoded data of the desired  
layer is designated from the hierarchical structure  
displayed in the display step.

- 5 6. An information processing apparatus for receiving  
encoded image data compression-coded for each tile and  
encrypting the encoded image data, characterized by  
comprising:

means for repeatedly forming one tile group from  
10 a plurality of adjacent tiles and another tile group  
from a plurality of adjacent tile groups so as to  
define a hierarchical structure of the tiles and tile  
groups, and for a plurality of partial encoded data  
that constitute encoded data of a tile located at a  
15 terminal of the hierarchical structure, arranging the  
partial encoded data toward the terminal in ascending  
order of priority in decryption so as to define a tree  
structure that nodes the respective tile groups, the  
respective tiles, and the respective partial encoded  
20 data;

means for generating encryption key information  
for a node located at an uppermost layer of the tree  
structure for an entire image expressed by the encoded  
image data;

- 25 means for executing, up to a node located at the  
terminal, processing for generating encryption key  
information for a node of interest on the basis of

encryption key information generated for a node located at an upper layer;

means for, when a designation input is given to define, as an object to be encrypted, a desired node position in nodes of the partial encoded data in the tree structure, setting, as an object to be encrypted, partial encoded data which is located at a higher layer and contains partial encoded data at the node position that is defined by the designation input; and

means for executing encryption processing for each partial encoded data, which is set as an object to be encrypted, by using an encryption key generated for the partial encoded data and outputting the encrypted partial encoded data and unencrypted partial encoded data.

7. A computer program which causes a computer that reads and executes the program to function as an information processing apparatus for receiving encoded image data compression-coded for each tile and encrypting the encoded image data, characterized by comprising:

means for repeatedly forming one tile group from a plurality of adjacent tiles and another tile group from a plurality of adjacent tile groups so as to define a hierarchical structure of the tiles and tile groups, and for a plurality of partial encoded data that constitute encoded data of a tile located at a

terminal of the hierarchical structure, arranging the partial encoded data toward the terminal in ascending order of priority in decryption so as to define a tree structure that nodes the respective tile groups, the  
5    respective tiles, and the respective partial encoded data;

          means for generating encryption key information for a node located at an uppermost layer of the tree structure for an entire image expressed by the encoded  
10   image data;

          means for executing, up to a node located at the terminal, processing for generating encryption key information for a node of interest on the basis of encryption key information generated for a node located  
15   at an upper layer;

          means for, when a designation input is given to define, as an object to be encrypted, a desired node position in nodes of the partial encoded data in the tree structure, setting, as an object to be encrypted,  
20   partial encoded data which is located at a higher layer and contains partial encoded data at the node position that is defined by the designation input; and

          means for executing encryption processing for each partial encoded data, which is set as an object to  
25   be encrypted, by using an encryption key generated for the partial encoded data and outputting the encrypted partial encoded data and unencrypted partial encoded

data.

8. A computer-readable storage medium characterized by storing the computer program of claim 7.

9. An information processing method of receiving  
5 information containing encoded data of both encrypted and unencrypted tiles and reproducing an image, characterized by comprising:

repeatedly forming one tile group from a plurality of adjacent tiles and another tile group from  
10 adjacent tile groups on the basis of the received information so as to define a hierarchical structure of the tile groups, and for a plurality of partial encoded data that constitute encoded data of a tile located at a terminal of the hierarchical structure, arranging the  
15 partial encoded data toward the terminal in ascending order of priority in decryption so as to define a tree structure that nodes the respective tile groups, the respective tiles, and the respective partial encoded data;

20 receiving key information to be used to decrypt a tile containing encrypted partial encoded data;

sequentially generating information up to desired partial encoded data located at a lower layer of a tile of interest on the basis of the received key  
25 information of the tile; and

decrypting each encrypted partial encoded data by using the key information generated for each partial

encoded data.

10. An information processing apparatus for receiving information containing encoded data of both encrypted and unencrypted tiles and reproducing an image,

5 characterized by comprising:

means for repeatedly forming one tile group from a plurality of adjacent tiles and another tile group from adjacent tile groups on the basis of the received information so as to define a hierarchical structure of the tile groups, and for a plurality of partial encoded data that constitute encoded data of a tile located at a terminal of the hierarchical structure, arranging the partial encoded data toward the terminal in ascending order of priority in decryption so as to define a tree structure that nodes the respective tile groups, the  
10 data that constitute encoded data of a tile located at a terminal of the hierarchical structure, arranging the partial encoded data toward the terminal in ascending order of priority in decryption so as to define a tree structure that nodes the respective tile groups, the  
15 respective tiles, and the respective partial encoded data;

means for receiving key information to be used to decrypt a tile containing encrypted partial encoded  
20 data;

means for sequentially generating information up to desired partial encoded data located at a lower layer of a tile of interest on the basis of the received key information of the tile; and

25 means for decrypting each encrypted partial encoded data by using the key information generated for each partial encoded data.

11. A computer program which causes a computer that reads and executes the program to function as an information processing apparatus for receiving information containing encoded data of both encrypted  
5 and unencrypted tiles and reproducing an image, characterized by comprising:

means for repeatedly forming one tile group from a plurality of adjacent tiles and another tile group from adjacent tile groups on the basis of the received  
10 information so as to define a hierarchical structure of the tile groups, and for a plurality of partial encoded data that constitute encoded data of a tile located at a terminal of the hierarchical structure, arranging the partial encoded data toward the terminal in ascending  
15 order of priority in decryption so as to define a tree structure that nodes the respective tile groups, the respective tiles, and the respective partial encoded data;

means for receiving key information to be used to  
20 decrypt a tile containing encrypted partial encoded data;

means for sequentially generating information up to desired partial encoded data located at a lower layer of a tile of interest on the basis of the  
25 received key information of the tile; and

means for decrypting each encrypted partial encoded data by using the key information generated for



each partial encoded data.

12. A computer-readable storage medium characterized by storing the computer program of claim 11.

13. A processing method of a server which is  
5 connected to a network for providing a decryption key for an image containing encoded data of both encrypted and unencrypted tiles, characterized by comprising:

for a plurality of partial encoded data that constitute encoded data of a tile, arranging the  
10 partial encoded data toward a terminal in ascending order of priority in decryption, and storing basic decryption key information located at an uppermost layer of the image which has a hierarchical structure constructed by repeatedly forming one tile group from a  
15 plurality of adjacent tiles and another tile group from adjacent tile groups; and

when information that designates partial encoded data to be decrypted is received from a client on the network, sequentially deriving decryption key  
20 information from the basic decryption key to a lower layer until reaching the designated partial encoded data of the designated layer and, when decryption key information for the corresponding partial encoded data is generated, notifying the client of the decryption  
25 key information.

14. A server which is connected to a network for providing a decryption key for an image containing

encoded data of both encrypted and unencrypted tiles,  
characterized by comprising:

means for, for a plurality of partial encoded  
data that constitute encoded data of a tile, arranging  
5 the partial encoded data toward a terminal in ascending  
order of priority in decryption, and storing basic  
decryption key information located at an uppermost  
layer of the image which has a hierarchical structure  
constructed by repeatedly forming one tile group from a  
10 plurality of adjacent tiles and another tile group from  
adjacent tile groups; and

means for, when information that designates  
partial encoded data to be decrypted is received from a  
client on the network, sequentially deriving decryption  
15 key information from the basic decryption key to a  
lower layer until reaching the designated partial  
encoded data of the designated layer and, when  
decryption key information for the corresponding  
partial encoded data is generated, notifying the client  
20 of the decryption key information.

15. A computer program which causes a computer that  
reads and executes the program to function as a server  
which is connected to a network for providing a  
decryption key for an image containing encoded data of  
25 both encrypted and unencrypted tiles, characterized by  
comprising:

means for, for a plurality of partial encoded

data that constitute encoded data of a tile, arranging the partial encoded data toward a terminal in ascending order of priority in decryption, and storing basic decryption key information located at an uppermost  
5 layer of the image which has a hierarchical structure constructed by repeatedly forming one tile group from a plurality of adjacent tiles and another tile group from adjacent tile groups; and

means for, when information that designates  
10 partial encoded data to be decrypted is received from a client on the network, sequentially deriving decryption key information from the basic decryption key to a lower layer until reaching the designated partial encoded data of the designated layer and, when  
15 decryption key information for the corresponding partial encoded data is generated, notifying the client of the decryption key information.

16. A computer-readable storage medium characterized by storing the computer program of claim 15.

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